USES OF ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY IN THE MANAGEMENT OF BILE DUCT STONES IN KURDISTAN CENTER FOR GASTROENTEROLOGY AND HEPATOLOGY

Ali Fadhil Al-Najjar * and Taha Karboly **

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ABSTRACT

Objectives

The purpose of this study is to document the extent of pre and post-cholecystectomy retained bile duct stones in our region with evaluation of the endoscopic retrograde cholangio pancreatography role in their management.

Design

Retrospective study.

Patients and Methods

This retrospective case series was carried out in Kurdistan center for gastroenterology and Hepatology in Sulaimani city–Iraq from January 2014 to January 2015. The records of 486 patients were retrospectively evaluated to collect demographic, clinical and procedure related data.

Results

The mean age was 51 years (range14-88 years).The female : male ratio was 2.01:1 with females constituted 325 (66.87%) while males constituted 161 (33.12%).Less than quarter of the patients were referrals from Iraqi governorates other than Sulaimani governorate. The mean duration of the ERCP procedure was 27.5 min. Deep cannulation was successful in 452 (93.01%) patients. There was 34 (6.99%) failure of cannulation. In cases that had successful cannulation a cholangiogram was obtained which showed bile duct dilatation. Endoscopic sphincterotomy is almost done in all cases before stone extraction, and it is an adjunct for stone removal which is done by basket or balloon. It was performed in 285 (84.2%) patients, followed by stone extraction in 341 (96.05%) patients, stenting in 208 (45.51%). The most common complications reported in this study were pancreatitis, bleeding and cholangitis. Elevated liver function tests and dilated CBD by ultrasound are the most accurate predictors of stones.

Conclusion

Despite its associated morbidity and risk of mortality, ERCP (Endoscopic Retrograde Cholangio Pancreatography) is an important method in managing pre and post cholecystectomy choledocholithiasis. Our indications, interventions and complications rates are comparable to those reported in other countries.

Keywords: *ERCP, KCGH, Sulaimani, Endoscopic sphincterotomy, Choledocholithiasis*

* Department of Anatomy, College of Medicine, University of Sulaimani.
* Department of Medicine, College of Medicine, University of Sulaimani.
Correspondence: tahakarboly@yahoo.com

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INTRODUCTION

Endoscopic retrograde cholangiopancreatography (ERCP) is a technique that uses a combination of luminal endoscopy and fluoroscopic imaging to diagnose and treat conditions associated with the pancreatobiliary system. After the introduction of endoscopic sphincterotomy in 1974, therapeutic pancreatico-biliary endoscopy subsequently emerged and ERCP has evolved from a diagnostic procedure to an almost exclusively therapeutic procedure [1, 2] .

Despite all the progress in technique and technology, ERCP is still associated with several complications, including pancreatitis, hemorrhage, perforation, cholangitis, and sedation related cardiopulmonary events, that occur in up to 10% of patients. ERCP has a mortality rate of up to1% [3].

Routine ERCP before cholecystectomy is not done and only performed in cases of assessment and treatment of biliary obstruction due to choledocholithiasis, persistent or worsening jaundice, persistent or worsening biliary (gall stone) pancreatitis, or ascending cholangitis is present. In 10-15% of the patients that underwent cholecystectomy, common bile duct stones were found either during the preoperative, intraoperative or postoperative evaluation [4-6].

ERCP has largely replaced surgery in the management of these problems [7], as it has comparable success rates and lower morbidity and mortality [8].

Therapeutic ERCP is associated with approximately 4-fold higher rates of severe complications as opposed to diagnostic ERCP [9, 10], but inspite of this the potential benefits are also greater, and the risk-to-benefit ratio favors therapeutic ERCP [11-13].

Sphincterotomy complications rate was highest when the indication for the procedure was suspected sphincter of Oddi dysfunction (SOD) (21.7%) and lowest when the indication was removal of CBD stones after laparoscopic cholecystectomy (4.9%). Pancreatitis developed in 19% of patients with suspected SOD, as compared with 3.6% of patients with other indications for sphincterotomy [14].

Patients with either a pathologic or an iatrogenic coagulopathy are at higher risk for post-ERCP hemorrhage so anticoagulant or antithrombotic therapy should be discontinued 5-7 days before elective ERCP, and the prothrombin time (PT) and partial thromboplastin time (PTT) should be evaluated on the day of the procedure.

Uses of prophylactic antibiotics are mandatory in all patients presenting with biliary obstruction and cholangitis or unsuccessful biliary drainage procedure. [15].

The commonest duodenal perforations due to sphinecterotomy are periampullary and usually retroperitoneal and managed with supportive care rather than immediate surgical intervention.

Perforations away from the ampulla are typically due to traumatic endoscope passage.

Absolute contraindications for ERCP include patient refusal to undergo the procedure; unstable cardiopulmonary, or neurologic and existing bowel perforation.

The structural abnormalities of the esophagus, stomach, or small intestine may be relative contraindications for ERCP.

The purpose of this study is to document the extent of pre and post-cholecystectomy retained bile duct stones in our region with evaluation of the ERCP role in their management.

PATIENTS AND METHODS

This retrospective study was carried out at Kurdistan center for gastroenterology and hepatology, a tertiary referral center, in Sulaimani city – Iraq from January 2014 to January 2015. The records of 486 patients were retrospectively evaluated to collect demographic, clinical and procedure related data. Patients were referrals from all Iraqi governorates.

The cases included in this study were patients with suspicion of bile duct stones. patients complaints were abdominal pain (mainly right hypochondrial pain), jaundice, fever, abdominal distension and cholangitis (table 1). All patients had blood testing (liver function tests, renal function tests) and transabdominal ultrasound. All patients underwent EUS or MRCP. The cases diagnosed as biliary leaking, ampullary tumors, pancreatic masses, *Fasciola hepatica* and hydatid cysts were excluded from this study.

After taking the written informed consent, ERCP was performed under conscious sedation with pulse oximetry monitoring by an experienced gastroenterologist. A basic cholangiogram was obtained to determine the

nature and site of the abnormality and then therapeutic interventions were performed accordingly.

After the ERCP, patients were observed in KCGH for 4-6 hours and then discharged with instructions to call or return back to the KCGH if any problem occurred. Those with suspected post-ERCP complications were admitted to the hospital for further management.

RESULTS

All cases examined by ERCP in the KCGH in Sulaimani over a period of one year (from January 2014 to January 2015) were 806 ,471 were female (58.43%) and 335 male (41.56%)

Cases in this study who had suspicion of bile duct stones and examined by ERCP in KCGH in the same period were 486 (60.29%), The mean age was 51years (range 14-88 years). The female: male ratio was 2.01:1 with females constituting 325 (66.87%) while males constituted 161 (33.12%). Less than quarter of the patients (N=108, 22.22%) were referrals from Iraqi governorates other than Sulaimani governorate.

In the suspected 486 cases of having bile duct stones, we found 312(64.19%) preoperative bile duct stones, 43(8.84%) presented as post cholecystectomy bile duct stones, 102(20.98%) Patients had dilated CBD without stones while 29(5.96%) cases had normal ERCP.(table 2)

The mean duration of the ERCP procedure was 27.5 min (range: 15-40 min). Deep cannulation was successful in 452 (93.01%) patients. Most cannulations were successful in the first trial of ERCP and only few cases required repeat ERCP procedure. There were 34 (6.99%) failure of cannulation, the causes of failed cannulation were duodenal stenosis, ulcer or deformity, a papillary lesion, or duodenal diverticulae and esophageogastric malignancies, irritable patient not cooperative made it difficult to maintain scope in position.

The cases of bile duct stones are divided into 2 groups:-

1-Pre cholecystectomy bile duct stones

2-Post cholecystectomy with retained bile duct stones, the time interval between operation and ERCP run from 24 hours until 2 years.

Totally 227 (72.75%) stents were inserted in pre cholecystectomy cases and 28 (65.11%) stents were inserted in post cholecystectomy cases.

These stents were removed by second session of ERCP after a period ranging from 1 to 6 months according to the patients stability and freedom of symptoms.

In seven cases during the second session to remove the stent we found that the plastic stents were slipped inside the CBD, in five cases succeeded to remove these stents, but in two patients failed to remove them.

The therapeutic interventions were (N=452) Endoscopic sphincterotomy in 285(84.2%) patients, stone extraction in 341(96.05%) patients, stenting in 208 (45.51%), stents removal usually in second session. (Table 3)

The most common complications reported in this study were pancreatitis (N=13, 2.67%) followed by bleeding (N=8, 1.64%).Hypoxia (N=5, 1.02), cholangitis (N=5, 1.02), and perforation of duodenum (N=3, 0.61), Two deaths were reported in this study their age above 80 years with sever Co morbidities (Table 4).

Table 1. Indications of ERCP, (N=486).

1	Right hypochondrial pain with\out jaundice	266
2	Cholangitis	21
3	Post cholecystectomy jaundice	28
4	Dilated CBD more than 10mm by U\S	396
5	Elevated liver enzymes with\out jaundice	47

Table 2. Findings of cholangiography, (N=486).

1	Pre cholecystectomy CBD stones	312	64.19%
2	Post cholecystectomy CBD stones	43	8.84%
3	Dilated CBD without stones	102	20.98%
4	Normal ERCP	29	5.96%
	Total	486	100%

Table 3. Therapeutic endoscopic interventions applied during ERCP , (N=486).

	Intervention	**Number**	**Percentage**
1	Endoscopic sphincterotomy	408	84.2
2	Balloon dilatation No EST	78	16.04
3	Stone extraction(N=355 stones)	341	96.05
4	Pre-operative CBD stent insertion	227	72.75
5	Postoperative CBD stent insertion	28	65.11
6	Stent slipped into CBD and removed	5	
7	Stent slipped into CBD and not removed	2	
8	Nasobiliary tube	3	

Table 4. Complications of ERCP , (N=486).

Complications	**Number**	**Percentage**
Pancreatitis	13	2.67
Bleeding	8	1.64
Perforation	3	0.61
Hypoxia	5	1.02
Death	2	0.41
Total	31	7.81

DISCUSSION

ERCP is now widely available and valuable tool for the management of biliary and pancreatic diseases and provide direct visualization and clear images of the pancreatico-biliary ductal systems [16-18].

The ERCP outcomes reported from developed and developing countries are variable, mainly depending on the complexity of the procedure, the underlying diagnosis and patient comorbidities. Consequently studies are required from each population to determine the success rate and outcome of ERCP [19].

We selected cholidochlithiasis in our study because it is the most common indication for ERCP

which is comparable to the indications reported from other studies [19, 20].

Although the rate of ERCP for postcholecystectomy duct stones in our study might be higher than those in other studies which might be attributed to that our center serves as a referral center for cases from other parts of Iraq where the training for laparoscopic cholecystectomy is still below the standards.

The mean duration of ERCP procedure was 27.5 minutes which is longer than that reported by other studies [19, 20] and is likely attributed to the complexity of the cases referred to our center.

Successful deep cannulation represents the most significant step of the diagnostic and therapeutic ERCP procedure [21]. Cannulation procedure is reported to achieve a success rate of 80-95% [21] our cannulation success rate was (93%). Deep cannulation failed in those with duodenal deformities, papillary pathologies or duodenal diverticulae. Deep cannulation is more likely to fail in those with anatomic variation or obstructive processes that preclude access to the duodenum, major papilla or the duct of interest [21].

The most common finding on ERCP was dilated bile duct. In most cases, this was associated with filling defects. The less invasive diagnostic modalities like trans-abdominal ultrasound and magnetic resonance cholangiopancreatography (MRCP) tended to perform less accurately in our study which could be due to the lack of adequate experience with the use of these tools in our area. Trans-abdominal ultrasound detected bile duct dilatation in only 82 cases while it suggested presence of bile duct stone in 439 cases i.e. it resulted in under-diagnosis of bile duct dilatation and over diagnosis of bile duct stones. It is important for the assessing clinician to remember the limitation of these non-invasive diagnostic tools and to go for ERCP based on the whole clinical scenario rather than the result of imaging studies alone. The major endoscopic intervention applied during ERCP in our study was endoscopic sphincterotomy which is one of the most important interventions that aids in the management of choledocholithiasis, also it facilitates biliary stent placement [21]. The rate of endoscopic sphincterotomy in our study was 84.2% which is comparable to that stated in the British Society of Gastroenterology (BSG) audit (84%) [22] , but below the rate reported in a study done by Mitra et al (94%) [20].

ERCP is highly effective in detecting and removing bile duct stones before laparoscopic cholecystectomy [23, 24]. It also helps to diagnose, and when combined with endoscopic sphincterotomy and/ or biliary stenting to manage post-cholecystectomy residual bile duct stones [25, 26]. Biliary stenting was successfully used in preoperative drainage when complete bile duct clearance was not ensured. It was also used in patients with large bile duct stones that could not be removed in a single session [27]. Because most of the ERCP complications become evident during the first 4-6 h, outpatient ERCP with follow up is thought to be a feasible and safe approach [28]. This approach is used in our center and patients who have persistent symptoms after 4-6 hours were admitted to the hospital for further evaluation. Complications associated with ERCP have been reported in up to10% with a mean of 4.0% [28]. In our study, the complication rate was 7.81%. Many factors affect the complication rates of ERCP such as experience of endoscopist in addition to patient co morbidities such as severe and incapacitating systemic diseases, obesity and complex procedures [29]. Acute pancreatitis is the most common complication after ERCP, with reported frequencies that range from 0.9% to 4.4% .In our study, the rate of post-ERCP pancreatitis was 2.67%. Predictors of acute pancreatitis include the presence of pancreatic duct catheterization, roentgenography, sphincterotomy, or suspected sphincter of Oddi dysfunction. Every effort was made in our center to reduce the rate of post-ERCP pancreatitis such as avoiding pancreatography and deploying pancreatic stent when inadverant pancreatic duct cannulation occurred in high risk patients.

The risk of post-sphincterotomy bleeding is 0.3-1.3%, which is higher in those on anticoagulant therapy. In our study, bleeding was reported in 1.64% cases but it

was minor bleeding that responded to local measures in the form of balloon compression, adrenaline spray and thermal therapy. No cases of severe bleeding necessitating blood transfusion or long hospital admission were reported. The risk of perforation during ERCP is also 0.3-1.3%, and, like the risk of bleeding, it is higher with sphincterotomy, stenting, and biliary or gastric Roux-en-Y diversion [28, 29]. All the three cases of post-ERCP perforation were retro-duodenal perforations that were managed conservatively without requiring surgical intervention. Acute cholangitis is seen in 0.4-1.8% of ERCP patients and this rate is even higher in patients with incomplete biliary obstruction [28, 29]. The rate of cholangitis in our study was 1.02%. Plastic biliary stents were deployed when there was no good bile and contrast drainage as judged by the operating endoscopist. Sedation related problems, such as hypoxia, arrhythmias, and respiratory or cardiac arrest, may develop in 0.5-1% of cases. This was reported in 1.02% in our study. The mortality rate from ERCP has been reported at up to 1.0% with a mean of 0.4% [29-31]. Unfortunately two deaths were reported in our study 0.41%. None of the uncommon or rare complications of ERCP were reported in our study which could include systemic air embolism, portal vein or hepatic artery cannulation or contrast allergy [32].

In conclusions, despite its associated morbidity and risk of mortality, ERCP is an important method in managing pre and post cholecystectomy choledocholithiasis. Our indications, interventions and complications rates are comparable to those reported in other countries

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